

**SYSTEM AND METHOD FOR CONTROLLING DEPOSITION PARAMETERS IN
PRODUCING A SURFACE TO TUNE THE SURFACE'S PLASMON RESONANCE
WAVELENGTH**

ABSTRACT OF THE DISCLOSURE

A system and method are disclosed which enable deposition parameters to be controlled in producing a metal surface to tune the localized surface plasmon resonance (LSPR) wavelength of such metal surface to a desired wavelength. For example, the surface produced may be used as an enhancement surface within a surface-enhanced spectroscopy process, wherein such surface is produced having a LSPR wavelength that provides the maximum extinction of a particular excitation light. In one embodiment, a metal is deposited onto a substrate, while controlling one or more deposition parameters to tailor the LSPR of the resulting metal surface to a desired wavelength. In one embodiment, the substrate is smooth, and does not require a mask prearranged thereon for controlling the LSPR wavelength. Rather, deposition parameters, such as temperature of the substrate, deposition rate, and film thickness may be controlled to effectively tune the LSPR wavelength of the metal surface.